EXPLANATION OF PLATE VII.

Fig. 1. *Tristychius fimbriatus*, Stock, nat. size.
Fig. 1 *a*. The same, restored.
Figs. 2 & 2 *a*. *Styracodus acutus*, Giebel (= *Tristychius* ?).
Figs. 3 & 3 *a*. Referred by Giebel to *Hybodus* (= *Pleuracanthus* ?).
Figs. 4 & 4 *a*. *Chilodus gracilis*, Giebel (= *Diplodus* ?).
Figs. 5 & 5 *a*. *Hybodus vicinalis*, Giebel (= *Tristychius* ?).
Figs. 6 & 6 *a*. *Hybodus carbonarius*, Giebel (= *Tristychius* ?).
Figs. 7 & 7 *a*. *Tristychius arcuatus*, Ag., nat. size, and point enlarged.
Fig. 8. *Tristychius arcuatus*, Ag., nat. size. *s*, fragment of pectoral spine; *n*, displaced neural spines; *r*, doubtful traces of the rays of the pectoral fin.
Fig. 9. Tooth of *Tristychius arcuatus*, Ag., nat. size.
Fig. 10. The same, showing base, nat. size.
Fig. 11. The same, nat. size.
Fig. 12. Four teeth of *Tristychius arcuatus*, Ag., in natural position, nat. size.
Figs. 13 & 13 *a*. Spine of *Tristychius arcuatus*, Ag.: fig. 13 nat. size; fig. 13 *a* enlarged, to show the nature of the sculpture.
Figs. 14 & 14 *a*. Dermal tubercle of *Hybodus carbonarius*, Giebel; fig. 14 enlarged.
Fig. 15. Dermal tubercle of *Tristychius arcuatus*, Ag., much enlarged.
Fig. 15 *a*. The same, one of the prongs much enlarged, to show the sculpture.
Fig. 16. Dermal tubercle of *Ctenacanthus hybodoides*, Ag., slightly enlarged.
Fig. 17. Dermal tubercle of *Gyracanthus tuberculatus*, Ag., much enlarged.
Fig. 17 *a*. The same, one of the prongs much enlarged to show the diagonal sculpture.
Fig. 18. Tooth of *Tristychius arcuatus*, Ag., enlarged, showing the slight elevation of the lateral cusps.
Fig. 19. *Styracodus acutus*, Giebel.

BIBLIOGRAPHICAL NOTICES.

Atlas de la description physique de la République Argentine contenant des vues pittoresques et des figures d'Histoire naturelle composées par le Dr. H. Burmeister, Directeur du Musée public de Buenos Aires, &c. Le texte traduit en français avec le concours de E. Daireaux. Deuxième section. *Mammifères.* Première Livraison. *Die Bartenwale der argentinischen Küsten.*

Erläuterungen zur Fauna Argentina, enthaltend ausführliche Darstellungen neuer oder ungenügend bekannter Säugethiere von H. Burmeister, &c. Erste Lieferung. *Die Bartenwale der argentinischen Küsten.* Buenos Aires: Paul-Emile Coni. Paris: F. Savy. Halle: Ed. Anton. 1881.

Dr. Burmeister's 'Natural History of the Argentine Republic' was interrupted on the completion of the first section by a change of government. The author, however, had from time to time trans-

mitted his materials to lithographers in Berlin, and was preparing to continue the work at his own cost, when the governor of the province placed some funds at his disposal on condition that copies of the work should be distributed in the Republic, leaving the author free to issue his work in German and to dispose of it in Europe. Hence the progress of the book will depend largely upon the reception it may meet with among naturalists in Europe and North America; and we can only trust that every encouragement may be extended to the author in his endeavour to carry out the great undertaking on which he is engaged. The part before us, which is complete in itself, comprises a description of the whalebone whales which visit the Argentine coast. This memoir consists of seven folio plates, which illustrate the external appearance of the *Balænoptera intermedia*, and the osteology of this species, as well as that of the *Balænoptera bonaërensis* and the *Balænoptera patachonica*. These plates are beautifully drawn; some were prepared as far back as 1870. They form an important contribution to our knowledge of the species which they illustrate. There is a brief folio description of the plates in French, and a synoptical table of the length of the individual vertebræ and the number of vertebræ in the several regions of the body in the three species figured. The text is in German, and consists of thirty-six pages quarto, which, between the introduction and conclusion, describes in detail the three species figured, and gives some notice of the *Megaptera Burmeisteri* and of the *Balæna australis*.

The introduction is a lively account of the author's first studies in 1825 of a fin-whale stranded on the island of Rügen; and this leads up to a recital of the difficulties which surrounded him in South America in having to make his studies on the sea-shore without the aid of trained assistants, and to measure these animals and their organs in the presence of excited and shouting crowds; but there is no need for apology on the author's part that he should confine himself on the present occasion chiefly to studies of the skeleton and of the external aspect of these whales; for although the species had been previously defined, it is only now that we are able to compare them in detail with the well-known fin-whales of Europe and of the Japanese seas.

The *Balænoptera bonaërensis* is given the first place in the description. A male stranded in 1867 has already been described by the author in the 'Proceedings of the Zoological Society' for that year, and, although in too advanced a stage of decomposition to permit near examination, was estimated to be 32 feet long, the head being 7 feet, the body and back 12 feet, and the tail 13 feet. Having given details of measurement and described the grey-white belly, the slaty-grey back, and the position of the genital organs relatively to the dorsal fin, he passes on to describe the baleen, which had already become detached from the head. The portion from one side which was recovered included only 192 plates out of a probable 250 to 260. The smallest plate was 7 or 8 centim. long; the longest, which was the 150th, was 32 centim. long; and behind this the plates again became shorter.

The skull is compared by the author with that figured by Eschricht as *Balænoptera rostrata*, from which it differs in carrying on to the mature condition the form which distinguishes the northern whale in the young state. The Argentine whale has the snout relatively shorter and more pointed. The expansion between the premaxillary bones is posterior in position, and oval; the nasal bones are small and narrow; and the frontal bone reaches further forward and is narrower in the orbital region than in the northern form. The occipital bone has the parabolic contour of the young *Balænoptera rostrata*, and covers the parietal and reaches the nasal, so as nearly to overlap the frontal bones. The fork of the maxillary is short. The palatine bone is short, and truncated rather than rounded in front. The jugal process of the squamosal bone does not extend so far outward as in the European species; and the jugal bone is slender and more curved in front. The vomer is relatively longer, and is partly cleft in front. These differences, which are regarded as specific, are accompanied by other differences in the vertebral column, though the number of vertebræ is the same. There are 7 cervical, 11 dorsal, 12 lumbar, and 18–20 caudal vertebræ. The first, second, fourth, and fifth cervicals are figured separately; and the author points out the many small differences which he regards as characterizing the South-Atlantic type, at the same time confessing that he no longer attaches so much importance to the lateral blending of the transverse processes into rings, as he did when the species was first instituted. In the dorsal region the spinous process increases in height from the first, in which it is 5 centim. long, to 38 centim. in the last dorsal. The height of the process increases to the middle of the lumbar region, and then declines, so that the process altogether disappears at the tenth caudal. The modifications of the vertebræ in the dorsal region are represented by drawings of the vertebral column and of the first and last dorsals, from which it is seen that the neural canal, which is at first triangular and has a slender arch, becomes ultimately vertically oval as the arch increases in strength, and the transverse processes, which were at first directed forward, come to be turned backward. The caudal region is characterized by the third to the tenth vertebræ having vertical perforations, which in the earlier vertebræ pass through the bases of the transverse processes, and in the later vertebræ through the centrum. There are twelve subvertebral bones in the caudal region. The tail-fin probably extended over six vertebræ. The ribs vary in the position of the tubercle and in their length and curvature. The first is 86 centim. long; the seventh is 146 centim. round the curve, while the tenth and eleventh are 92 centim. in the same measurement. The sternum is very remarkable in having the anterior limb of the cross subdivided into two; it is 44 centim. long and has the usual facets for the first rib on the middle of the posterior process. The scapula is chiefly remarkable for the sharp-pointed form of the acromion and coracoid processes. The fore limb is somewhat slender, with the humerus 28 centim. long and the ulna and radius 56 centim. long. Both these bones are curved

backward; and the olecranon projects conspicuously beyond both the ulna and humerus. There are five carpal bones, three forming a large proximal row below the epiphyses of the ulna and radius, and two small bones forming a lower row. These carpals are named the naviculare, lunatum, triquetrum, hamatum, and capitulum. There are four digits, which correspond to the second to fifth. The second is slender and contains five bones, the third stout, with six bones; the fourth has five bones, all stouter than those of the second; while the fifth digit has four bones, which rapidly diminish in size. The hinder extremity is represented by a single bone, probably pelvic, but of somewhat unusual form, though most like the pelvic bone of *Balænoptera rostrata*. The hyoid is very similar to that of the North-Atlantic species.

The second species, *Balænoptera patachonica*, is described from a perfect specimen, obtained in 1871, which was 50 feet long. Its form was more slender than the species just described, and closely resembles the *Balænoptera musculus*, but was unfortunately stripped of flesh before seen by the author. He remarks on the differences which this skeleton shows from an imperfect specimen which was in the museum before it came under his direction, and is disposed to attribute the differences to sex and age. The skull is described in some detail, and the figures demonstrate its difference from other Argentine species; but Dr. Burmeister has been limited to the use of figures in comparing it with the northern form, which it most resembles. The first found specimen, which was figured in the 'Proceedings of the Zoological Society' for 1865, and which may therefore claim to be the type, differs, so far as can be judged from the figure there given, to an inconvenient degree from the new type now figured. The vomerine bones of the second specimen extend further forward than in the first type; but in that type the frontal bones extend further outward, so as to cover and hide the jugal bones, the nasal bones are narrower and longer, the notches external to the occipital condyles are deeper, and the snout tapers forward in a manner more marked. Other differences no less obvious are to be detected in the representations of the vertebræ and scapula; so that the species must be regarded as extremely variable; and this circumstance is suggestive of the probability that more abundant materials would do something towards blending it with the northern species, to which Burmeister indicates its affinity.

In his account of the neck the author restricts himself chiefly to establishing the differences between the vertebræ of the three species which he describes. The atlas of the *Balænoptera patachonica* has the occipital facets too close together to receive the dentata between them as in the other species; and the form of the neural arch is distinctive of the axis in all three. The form and arrangement of the transverse processes differ considerably in the later cervicals. The length of the neural spine, as usual, is very little in the cervical region; but in the dorsal region it soon attains a considerable elevation, though relatively shorter than in the *Balænoptera bonaërensis*. The height of the neural spine still increases a

little in the lumbar region before declining again so as to disappear in the tail. Just as the elevation of the spine is less remarkable than in the former species, so it dwindles away more gradually, being very small between the eighth and fourteenth caudal vertebræ. The differences from the *Balænoptera intermedia* are rather less striking, but are exhibited in the relative size of the centrum, the length of the transverse process and the form of the neutral spine in the caudal region, which is broad at its upper termination in the *Balænoptera patachonica*, and narrow or rounded above in the *Balænoptera intermedia.* But in the type described in 1865 this difference is much less marked.

The ribs increase in length from 92 centim. in the first to 175 centim. in the fifth; they then diminish to 120 centim. in the fifteenth, while the sixteenth is 85 centim. long. On one side there is a seventeenth rib 42 centim. long. The differences in form of the head of the rib are considerable when the specimen now described is compared with that figured in Proc. Zool. Soc. 1865. The sternum is of a broad T-shaped form, having the transverse limbs broad and strong, with a longitudinally oval perforation between them; the facets for the first pair of ribs are placed close behind the great transverse bar. The width of the bone is 45 centim., and its length 38 centim. In the remainder of the skeleton the divergences from the northern species are less marked. The differences between the scapulæ of the two individuals are not very great in size. The fore limb has a length of 1·80 metre. The proportions of the several elements necessarily offer but few differences; the radius and ulna are conspicuous for their straightness, and the moderate elongation of the olecranon process, which scarcely extends beyond the stout humerus. The phalanges are comparatively uniform in character: the middle digit, as usual, is the longest; it contains seven phalanges, while there are six in the fourth, and five in the fifth digit. There is no trace of a hind limb, except a triangular bone, which is probably to be referred to the pelvis.

Having described the skeleton, the author discusses the characters on which he relies to distinguish it from *Balænoptera musculus.* In the head specific characters are found in the relative width of the parietal, frontal, and the orbital plate of the maxillary. Another difference is in the intermaxillary being stronger posteriorly; and it encloses a long elliptical hole above the vomer, while in the southern species this hole is short. The occipital bone is broader in the southern form. There is apparently one more dorsal vertebra and at least one more pair of ribs.

Balænoptera intermedia is known from both male and female specimens. It is intermediate between the *Balænoptera patachonica* and the *Balænoptera Sibbaldii.* The body of one specimen was 58 feet long; where thickest, behind the pectoral fin, it was about 9 feet high. The lower jaw extended somewhat in advance of the head. The pectoral fin has a sickle-shaped form, is 8 feet long and 3 feet wide in the broadest part, and is placed 5 feet behind the eye. The whole of the underside is marked in its anterior half with parallel

longitudinal grooves, about an inch deep, which extend forward to near the extremity of the lower jaw. The tail-fin is 4 feet long in the middle, and each lateral half is 8 feet long. The dorsal fin is only 15 feet from the extremity of the tail, and is placed above the anal region ; it is $2\frac{1}{2}$ feet long. The body is dark slate-grey, with the back nearly black. The second specimen was 60 feet long, and had about one hundred furrows on the underside. The sexual differences are indicated ; and it would seem that, notwithstanding the larger size of this individual, the anal aperture is only 15 feet from the extremity of the tail. The lobes of the tail are smaller, and each is only $6\frac{3}{4}$ feet wide ; the back fin also is smaller. The male specimen is more slender and of a darker colour, and has relatively smaller pectoral fins. The baleen extends along the mouth for about 6 feet ; the plates are triangular, and where longest have a length of 2 feet. They diminish in length to a few inches, and form mere pencil-like tufts.

In this second specimen the entire length of the skull is only 10 feet 8 inches, and is only a little longer, but relatively wider, than that of *Balænoptera patachonica*.

The outer border of the maxillary bone is remarkably convex ; the lateral parts of the occipital bone do not diverge backward so much as in the other species ; the nasal bones extend back to the line of the orbit ; the premaxillary bones have a remarkable process inclining inward, where the frontal branch of the maxillary diverges—a condition somewhat similar to that seen in the *Balænoptera Sibbaldii*. Thus the distinction of this species from those which it most resembles is set forth. Similarly the vertebral column is somewhat stronger than in the foregoing species. There are seven cervical, fifteen dorsal, sixteen lumbar, twenty-six caudal vertebræ. The detailed descriptions and measurements assist the figures in illustrating the characters of this part of the skeleton ; and the author follows the same general plan previously adopted in his descriptions. The sternum was lost in maceration. The fore limb is almost entirely unknown, though the author gives a beautiful drawing of its osteology on the basis, as he states, of analogy with its northern representative.

Megaptera Burmeisteri is still only known from the skeleton, 50 feet long, which was found overgrown with willows on an island in the delta of the Parana, where it lay partly buried ; and but few additions have been made to the original materials, though among these are the tympanic and petrosal bones.

Balæna australis occurs off the South-American coast : but no specimen has hitherto been captured in the Argentine waters.

Finally, in a brief conclusion, the author justifies his mode of dealing with the material.

The descriptions are excellent throughout, and relieved by a recital of incidents in the history of the specimens which are not without humour. The illustrations leave nothing to be desired ; and the work will take a place among important monographs of the Cetacea.